

Amendments to the Drawings

One sheet of replacement drawings is provided in which the label "Prior Art" has been added to Figs. 1 and 2. Thus, applicants request that the objection to the drawings be withdrawn.

Remarks

This submittal is responsive to the office action mailed July 7, 2005. Applicants note with appreciate the indication of allowable subject matter in claims 9-12, 19, 23-26, 29 and 30. Claims 1, 5, 13 and 14 have been amended; claims 19 and 31-39 have been cancelled; and new dependent claims 40-49 have been added. No new matter has been added, and the claims are believed to be in condition for allowance.

In the office action mailed July 7, 2005, the examiner

- objected to the drawings;
- rejected claim 5 under 35 U.S.C. § 112, second paragraph, as indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as his invention;
- rejected claims 1, 3-6 and 13 under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 6,221,765 to Ueno ("the Ueno patent");
- rejected claims 2 and 7-8 under 35 U.S.C. § 103(a) as unpatentable over the Ueno patent;
- rejected claims 14-18, 20-22, 27 and 28 under 35 U.S.C. § 103(a) as unpatentable over the Ueno patent in view of U.S. Patent Application Publication No. 2005/0095847 to Kunishima et al. ("the Kunishima application");
- objected to claims 9-12, 19, 23-26 and 29 as being dependent upon a rejected base claim, but indicated that they would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims;
- allowed claim 30.

Objections to the Drawings

The examiner objected to the drawings, because Figs. 1 and 2 do not contain a label indicating that they illustrate the prior art. One sheet of replacement drawings is submitted, in which Figs. 1 and 2 are clearly labeled "Prior Art." Thus, applicants request that this objection be withdrawn.

Rejections Under 35 U.S.C. § 112, Second Paragraph

The examiner rejected claim 5 under 35 U.S.C. § 112, second paragraph, because the limitation "said metal" has insufficient antecedent basis. Specifically, it is unclear whether "said metal" refers to the "first metal" or "second metal" recited in base claim 1.

Claim 5 has been amended to recite "said first metal layer" in lieu of "said metal." Thus, applicants request that this rejection be withdrawn, and that the claim be allowed.

Rejections Under 35 U.S.C. § 102(b)

Claims 1, 3-6 and 13 were rejected under 35 U.S.C. § 102(b) as anticipated by the Ueno patent.

Claim 1 has been amended to recite:

"A method of forming a metal interconnect in an opening formed on a substrate, comprising:
(a) providing a substrate with an opening formed therein;
(b) forming a seed layer within said opening;
(c) forming a first metal layer on said seed layer by a first electrochemical plating (ECP) process to partially fill said opening;
(d) performing a first anneal step;
(e) forming a second metal layer on said first metal layer with a second ECP process to fill said opening; and
(f) performing a second anneal step;
wherein the first ECP process is performed using a first current density and the second ECP process is performed using a second current density, the first and second current densities being unequal."

Claim 1 is not anticipated by the Ueno patent because that reference fails to disclose "... forming a first metal layer on said seed layer by a first electrochemical plating (ECP) process to partially fill said opening ... performing a first anneal step ... forming a second metal layer on said first metal layer with a second ECP process to fill said opening; and ... performing a second anneal step; wherein the first ECP process is performed using a first current density and the second ECP process is performed using a second current density, the first and second current densities being unequal." The Ueno patent does not discuss current densities at all in relation to the deposition of its first and second plating films 6, 7 (*see* the Ueno patent, col. 7, line 53 – col. 8, line 7), and thus it does not disclose "[a] first ECP process ... performed using a first current density and [a] second ECP process ... performed using a second current density, the first and second current densities being unequal."

Thus, because the Ueno patent fails to disclose every limitation of independent claim 1, applicants request that the 35 U.S.C. § 102(b) rejection of claim 1 be withdrawn, and that

the claim be allowed. With respect to claims 3-6 and 13, which depend from independent claim 1, and recite additional features of the invention, applicants request that the 35 U.S.C. § 102(b) rejection of these claims be withdrawn and that they be allowed for the same reasons stated for claim 1.

Rejections Under 35 U.S.C. § 103(a)

Claims 2 and 7-8

Claims 2 and 7-8 were rejected under 35 U.S.C. § 103(a) as unpatentable over the Ueno patent.

Claims 2 and 7-8 depend directly or indirectly from independent claim 1. Thus, for the same reasons as stated above in regards to the non-anticipation of claim 1 by the Ueno patent, applicants believe claims 2 and 7-8 to be allowable. Specifically, the Ueno patent fails to disclose, teach or suggest "... forming a first metal layer on said seed layer by a first electrochemical plating (ECP) process to partially fill said opening ... performing a first anneal step ... forming a second metal layer on said first metal layer with a second ECP process to fill said opening; and ... performing a second anneal step; wherein the first ECP process is performed using a first current density and the second ECP process is performed using a second current density, the first and second current densities being unequal." The Ueno patent fails to disclose, teach or suggest that the current densities used to deposit the first and second plating films 6, 7 are different. (See the Ueno patent, col. 7, line 53 – col. 8, line 7).

Thus, applicants request that the 35 U.S.C. § 103(a) rejections of claims 2, 7 and 8 be withdrawn, and that these claims be allowed.

Claims 14-18, 20-22, 27 and 28

Claims 14-18, 20-22, 27 and 28 were rejected under 35 U.S.C. § 103(a) as unpatentable over the Ueno patent in view of the Kunishima application.

Claim 14 has been amended to incorporate the language of dependent claim 19, which the examiner has indicated as containing allowable subject matter. Thus, applicants request that the 35 U.S.C. § 103(a) rejection of this claim be withdrawn, and that claim 14 be allowed. With respect to claims 15-18, 20-22, 27 and 28, which depend directly from

independent claim 14, and which recite additional features of the invention, applicants request that the 35 U.S.C. § 103(a) rejections of these claims be withdrawn, and that these claims be allowed for the same reasons stated for claim 14.


New Dependent Claims 40-48

New dependent claims 40-48 have been added to depend from allowed claim 30. The examiner has indicated claim 30 as being allowable, and thus claims 40-48 are believed to be in allowable form.

No fees are deemed due with this response, however, should any fees be required, the Commissioner for Patents is hereby authorized to charge any such required fees to deposit account **50-2061**.

Respectfully submitted,

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